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SEQUENCE LISTING

<110> FRASER JR., MALCOLM J.
LI, XU
BEAM, TERESA

<120> METHODS AND COMPOSITIONS FOR TRANSPOSITION USING
MINIMAL SEGMENTS OF THE EUKARYOTIC TRANSFORMATION
VECTOR PIGGYBAC

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<140> 10/001,189
<141> 2001-10-30

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<151> 2000-11-01

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<170> PatentIn Ver. 2.1

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<223> Description of Artificial Sequence: Plasmid
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<210> 43

<211> 4971

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: pBSII-IFP2-orf
sequence

<400> 43

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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: pBSII-IEI-orf
sequence

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<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
pBXP3-DsRed-orf sequence

<400> 45

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<223> Description of Artificial Sequence: pCRII-ITR
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Glu Ala Ala Trp Lys Glu Phe Ala Glu Asp Asp Cys Cys Cys Ile Asp
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<213> Artificial Sequence

<223> Description of Artificial Sequence: pCRII-ITR
amino acid sequence

Leu	His	Gln	Asp	His	Ile	Val	Gly	Ser	Phe	Phe	Arg	Leu	Ser	His	Arg
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Pro	Ser	Trp	Arg	Tyr	Leu	Gly	Ile	Gly	Glu	Glu	Glu	Ala	Arg	Ala	Phe
			20					25					30		
Ser	Arg	Glu	Val	Glu	Ala	Ala	Trp	Lys	Glu	Phe	Ala	Glu	Asp	Asp	Cys
		35					40					45			
Cys	Cys	Ile	Asp	Val	Glu	Arg	Lys	Arg	Thr	Phe	Thr	Met	Met	Ile	Arg
	50					55					60				
Glu	Gly	Val	Ala	Met	His	Ala	Phe	Asn	Gly	Glu	Leu	Phe	Val	Gln	Ala
65					70					75					80
Thr	Trp	Asp	Thr	Ser	Ser	Ser	Arg	Leu	Phe	Arg	Thr	Gln	Phe	Arg	Met
				85					90					95	
Val	Ser	Pro	Lys	Arg	Ile	Ser	Asn	Pro	Asn	Asn	Thr	Gly	Asp	Ser	Arg
			100					105					110		
Asn	Cys	Arg	Ala	Gly	Val	Gln	Ile	Asn	Asp	Ser	Gly	Ala	Ala	Leu	Gly
		115					120					125			

Tyr Tyr Val Ser Glu Asp Gly Tyr Pro Gly Trp Met Pro Gln Lys Trp
 130 135 140

Thr Trp Ile Pro Arg Glu Leu Pro Gly Gly Arg Ala Ser Phe Ile His
 145 150 155 160

Val Phe Glu Pro Val Glu Asp Gly Gln Thr Arg Gly Ala Asn Val Phe
 165 170 175

Tyr Ser Val Met Glu Gln Met Lys Met Leu Asp Thr Leu Gln Asn Thr
 180 185 190

Gln

<210> 48

<211> 8999

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: p(PZ)-Bac-EYFP
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<400> 48

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<210> 49

<211> 9012

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: p(PZ)-Bac-ECFP
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<210> 51

<211> 4951

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pXL-Bac-EYFP
sequence

<400> 51

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<210> 52

<211> 4952

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pXL-Bac-EGFP sequence

<400> 52

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<210> 53

<211> 4941

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pXL-Bac-ECFP
sequence

<400> 53

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<210> 54

<211> 4943

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PBS-ITR-ECFP sequence

<400> 54

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<211> 4944

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PBS-ITR-EGFP
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<400> 55

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<211> 4944

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: pBS-ITR-EYFP

sequence

<400> 56

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<211> 7670

<212> DNA

<213> Artificial Sequence

<220>

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<210> 58

<211> 286

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pIAO-pL amino acid sequence

<400> 58

Trp	His	Lys	Ile	Leu	Ser	Ala	Gly	Ile	Glu	Ala	Ile	Gln	Arg	Asn	Arg	1	5	10	15
Glu	Asp	Met	Thr	Ala	Gln	Ser	Gly	Thr	Thr	Tyr	Ile	Val	Val	Ile	Arg	20	25	30	
Ser	Pro	Lys	Gly	Asp	Pro	Gly	Leu	Ala	Ala	Ile	Ile	Gly	Arg	Ser	Gly	35	40	45	
Arg	Glu	Gly	Ala	Gly	Ser	Lys	Asp	Ala	Ile	Phe	Trp	Gly	Ala	Pro	Leu	50	55	60	
Ala	Ser	Arg	Leu	Leu	Pro	Gly	Ala	Val	Lys	Asp	Ala	Glu	Met	Trp	Asp	65	70	75	80
Ile	Leu	Gln	Gln	Arg	Ser	Ala	Leu	Thr	Leu	Leu	Glu	Gly	Thr	Leu	Leu	85	90	95	
Lys	Arg	Leu	Thr	Thr	Ala	Met	Ala	Val	Pro	Met	Thr	Thr	Asp	Arg	Glu	100	105	110	
Asp	Asn	Pro	Ile	Ala	Glu	Asn	Leu	Glu	Pro	Glu	Trp	Arg	Asp	Leu	Arg	115	120	125	
Thr	Val	His	Asp	Gly	Met	Asn	His	Leu	Phe	Ala	Thr	Leu	Glu	Lys	Pro	130	135	140	
Gly	Gly	Ile	Thr	Thr	Leu	Leu	Leu	Asn	Ala	Ala	Thr	Asn	Asp	Ser	Met	145	150	155	160
Thr	Ile	Ala	Ala	Ser	Cys	Leu	Glu	Arg	Val	Thr	Met	Gly	Asp	Thr	Leu	165	170	175	
His	Lys	Glu	Thr	Val	Pro	Ser	Tyr	Glu	Val	Leu	Asp	Asn	Gln	Ser	Tyr	180	185	190	
His	Ile	Arg	Arg	Gly	Leu	Gln	Glu	Gln	Gly	Ala	Asp	Ile	Arg	Ser	Leu	195	200	205	
Val	Ala	Gly	Cys	Leu	Leu	Val	Lys	Phe	Thr	Ser	Met	Met	Pro	Phe	Arg	210	215	220	
Glu	Glu	Pro	Arg	Phe	Ser	Glu	Leu	Ile	Lys	Gly	Ser	Asn	Leu	Asp	Leu	225	230	235	240
Glu	Ile	Tyr	Gly	Val	Arg	Ala	Gly	Leu	Gln	Asp	Glu	Ala	Asp	Lys	Val	245	250	255	
Lys	Val	Leu	Thr	Glu	Pro	His	Ala	Phe	Val	Pro	Leu	Cys	Phe	Ala	Ala	260	265	270	

Phe Phe Pro Ile Leu Ala Val Arg Phe His Gln Ile Ser Met
 275 280 285

<210> 59

<211> 240

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pIAO-pL amino acid sequence

<400> 59

Arg Tyr Phe Tyr Ala Tyr Pro Ala Arg Leu His Val Leu Gln Val Tyr
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Tyr Ser Leu Arg Ala Cys Ala Lys Ile Val Gly Glu Arg Leu Ile Arg
 20 25 30

Thr Thr Ser Arg Gln Asp Thr Asn Arg Lys Gly Phe Leu Ala Asn Trp
 35 40 45

Lys Asp Tyr Val Glu Tyr Trp Gln Val Asp His Pro Asn Lys Asn Trp
 50 55 60

Val Lys Ala Gln Lys Pro Tyr Val Asp Val Ser Val Thr Arg Phe Trp
 65 70 75 80

Thr Val Thr Arg His Asp Phe Ser Gly Arg Ser His Leu Lys Thr His
 85 90 95

Val Ser Pro Tyr Leu Ser Gly Met Asn Lys Cys Ser Tyr Ile Cys Arg
 100 105 110

Lys Arg Ser Thr His Ala Thr Tyr Lys Gln Gly Asn Ser Met Thr Asp
 115 120 125

Phe Phe Gly Phe Arg Asp Val Ser Glu Asn Cys Leu Arg Val Cys Gln
 130 135 140

Cys Leu Asp Ile Trp Leu Pro Arg His Val His Pro Arg Lys Glu Ser
 145 150 155 160

Ser Asp Asn Gly Ser Tyr Trp Leu Phe Cys Leu Asn Arg Glu His Ser
 165 170 175

Ile Tyr Cys Arg Asp Tyr Ile Gly Ser Thr Glu Ile Ile Asp Cys Lys
 180 185 190

Asp Met Lys Cys Asn Ala Phe Asn Asp Tyr Phe Ile Thr Gln Leu Met
 195 200 205

Phe Thr Pro Ile Tyr Gln Pro Val Tyr Ala Asp Ser Arg Lys Ser Ile
 210 215 220

Gln Cys His Glu Thr Cys Leu Ser Pro Arg Glu His Val Lys Phe Asn
 225 230 235 240

<210> 60
 <211> 933
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pIAO-pL amino acid sequence

<400> 60

Lys	Gln	Cys	Trp	Val	Leu	Gln	Tyr	His	Tyr	Arg	Gly	Ala	Ser	Leu	Gln	1	5	10	15
Phe	Glu	Ala	Ser	Val	Ser	Pro	Ser	Trp	Ser	Asp	Asp	Gly	Gly	Ile	Gly	20	25	30	
Met	His	Phe	Gly	Asp	Ile	Asn	Leu	Trp	Thr	Gly	Glu	Glu	Ala	His	Leu	35	40	45	
Leu	His	Arg	His	Ser	Thr	Glu	Met	Leu	Gln	Gln	Gln	Ser	Tyr	Arg	Ser	50	55	60	
Ile	Asn	Phe	Gln	Phe	Asp	Gly	Arg	Trp	Gln	His	Pro	Gly	Tyr	Asn	Leu	65	70	75	80
Glu	Arg	Thr	Gly	Cys	Arg	Leu	Gly	Asn	Glu	Ser	Pro	Phe	Val	Tyr	Pro	85	90	95	
Thr	Tyr	Met	Asp	Ser	Leu	Pro	Leu	Asp	Trp	Arg	Asp	Phe	Cys	Ala	Ala	100	105	110	
Thr	Leu	Arg	Asp	Pro	Tyr	Asn	Glu	Gln	Pro	Gly	Leu	Gly	Leu	Trp	Asn	115	120	125	
Val	Arg	Glu	Ala	Val	Gln	Ala	Leu	Gln	Cys	Asn	Leu	Gly	Ile	Arg	Ala	130	135	140	
Pro	His	Pro	Thr	Asp	Ser	Ala	Val	Glu	Val	Asp	Val	Thr	Ile	Ala	Met	145	150	155	160
Gln	Gly	Ser	Gly	Asp	Ile	Arg	Tyr	Thr	Lys	Arg	Ser	Ile	Phe	Leu	Thr	165	170	175	
Lys	Gly	Gln	His	Gln	Trp	Ala	His	Ala	Thr	Thr	Ile	Leu	Val	Ala	Asp	180	185	190	
Ala	Leu	Thr	Asp	Ala	Thr	Cys	Gln	Leu	Leu	Ala	Ala	Glu	Ala	Gln	Tyr	195	200	205	
His	Gly	Ala	Ala	Lys	Trp	Arg	Glu	Val	Trp	Ala	Asn	Pro	Asp	Ile	Arg	210	215	220	
Thr	Ala	Glu	Ser	Val	Gly	Ile	Asp	Asn	Asp	Leu	Pro	Ala	Arg	Thr	Phe	225	230	235	240

Gln Asp Arg Leu Pro Thr Leu Leu Gln Lys Lys Asp Gly Ile Trp Met
 245 250 255
 Gln Ser Leu Phe Gly Ser Gln Arg Asn Phe Gln Trp Arg Lys Asn Gly
 260 265 270
 Leu Glu Ile Cys Phe Asp Met Glu Ser Thr Thr Leu His Pro Ile Ala
 275 280 285
 His Ser Ala Ala Pro Leu Thr Val Ser Leu Asn Glu Ala Leu Arg Trp
 290 295 300
 Gln Gln Trp Ala Ser Ile His Gly Ala Glu Ser Trp Ala Thr Ala Asn
 305 310 315 320
 Pro Gln Val Val Arg Val Thr Leu Trp Leu Gln Gly Ala Ser Glu Pro
 325 330 335
 Gln Pro Leu Glu Pro Leu Glu Ile Leu Gln Lys Gly Gln Pro Ala Val
 340 345 350
 Asp Leu Pro Val Glu Gly Ser Ala Leu Pro Lys Gly Asp Leu Ala Val
 355 360 365
 Met Trp His Leu Leu Glu Asn Asp Ser His Arg Phe Leu Tyr Glu Ser
 370 375 380
 Thr Val Glu Ile Thr Gln Gly Ser Leu Arg Phe Gln Phe Phe Gln Gln
 385 390 395 400
 Gln His Lys Ala Glu Thr Leu Ala Pro His Pro Thr Arg Asp Ala Phe
 405 410 415
 Val Leu Gly Asn Met Cys Phe Gln Arg Asp Asn Pro Thr Asp Gly Phe
 420 425 430
 Asp Gly Gly Tyr Ala Ser Trp Pro Asn Gly Asn Glu Asp Tyr Lys Ile
 435 440 445
 Leu Ser Gln Asp Val Trp Asp Trp Val Phe Gly Gly Gln Leu Arg Pro
 450 455 460
 Tyr Gln Arg Phe Ala Gln Trp Tyr Lys Ala Phe Gly Gly Leu Ser Asn
 465 470 475 480
 Gly Met Ala His Ala Tyr Glu Cys Leu Ile Leu Pro Arg Thr Glu Gly
 485 490 495
 Pro Leu Ser Leu Trp Lys Lys Ile Ser Trp Lys Pro Val Ala Pro Phe
 500 505 510
 Pro Gln Asp Glu Asp Val Arg Ala Tyr Met Pro Cys Ile Ile Asp Thr
 515 520 525
 Ala Thr Thr Asp Ala Gly Gly Gly Glu Tyr Gln Val Pro Arg Ser Pro
 530 535 540

Asp Val Ser Lys Ile Trp Arg Tyr Leu Ala Asp His Asn Ala Gly His
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 Gly Ser Glu Asn Gly Leu Ser Trp Ile Ile Val Ser Pro His Asn Arg
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 Asp Arg Gln Val Met Arg Thr Val Arg Glu Ser Met Ala Pro Leu Trp
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 Arg Pro Asp Asp Thr Leu Arg Asn Met Pro Val Met Gly His Thr Glu
 595 600 605
 Ile Asn Ala Glu Asp Val Val Tyr Leu Gly Tyr Arg Asp Cys Leu Thr
 610 615 620
 Tyr Trp Leu Pro His Asn Pro Tyr His Ser Cys Arg Val Ala Asn Phe
 625 630 635 640
 Asn Asn Gln Lys Met Leu Leu Ile Asp Gln Val Met Thr Gln Glu Asp
 645 650 655
 Met Val Gln Gly His Leu Pro His His Glu His Arg Asn Val Gly Arg
 660 665 670
 Ile Leu Leu Pro Lys Gly Asn Leu Leu Leu Leu Gly Asn Glu Ile Arg
 675 680 685
 Val Glu Arg Phe Gly Val Asp Cys Ala Glu Ala Glu Ile Leu Thr Gly
 690 695 700
 Asp Ala Thr His Leu Glu Val Val Ala Arg Tyr Leu Asn Pro Ile Glu
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 Ala Ser Trp Leu Lys Pro Asn Glu Val Asn Leu Arg Leu Thr Val Arg
 725 730 735
 Asp Ala Tyr Gly Gly Arg Glu Asp Ile Ile Glu Gly Gly Phe Pro Ala
 740 745 750
 Thr Gly Ser Ala Val Gln Thr Glu Gly Gln Trp Leu Ser Val Thr Val
 755 760 765
 Arg Leu Tyr Asp Arg Leu Glu Gly Cys Met Gln Val Glu Ala Glu Leu
 770 775 780
 Val Ala Arg Ser Phe Asp Asp Asn Phe Arg Thr Ala Val His Phe Asp
 785 790 795 800
 Ser Ile Gln Thr Thr Pro Lys His Leu Leu Ser Val Asp Arg Phe Ile
 805 810 815
 Gly Ser Met Arg Trp Met Asp Gln Asp Glu Leu Tyr Ser Gly Asp Ser
 820 825 830
 Trp Arg Leu Val Met Val Ala Leu Arg Asn Glu Gly Ala Arg Leu Phe
 835 840 845

Ala Ser Leu Asp Phe Glu Ser Pro Leu Arg Ser Asp Gln Gly Tyr Gly
850 855 860

Val Trp Arg Gly Asn Cys Trp Leu His Phe Ala Ser Asn Val Gly Asp
865 870 875 880

Phe Ile Ile Arg Thr Gln Gly Glu Gln Leu Trp Ser Glu Asp Val Asn
885 890 895

Phe Thr Leu Ser Tyr Cys Gly Thr Pro Asn Glu Thr Pro Val Phe Pro
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Pro Asn Val Thr Ile Pro Tyr Thr Val Asn Thr Tyr Ile Pro Ala Asp
915 920 925

Tyr Gly His Met Gln
930

<210> 61
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: pIAO-pL amino
acid sequence

<220>
<221> MOD_RES
<222> (110)
<223> Any amino acid

<400> 61
Val Leu Leu Thr Glu Trp Asn Ser Pro Val Val Val Pro Asp Thr Lys
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Lys Asn Cys Phe Gln Ser Phe Leu Leu Ile Ser Ile Glu Ser Trp Cys
20 25 30

Arg Tyr Asp Glu Thr Ala Leu Asp Leu Asn Gln Phe Gly Ile Phe Phe
35 40 45

Arg Thr Thr Tyr Cys Lys Thr Arg Arg Ile Asn Ala Gln Arg Gln Ser
50 55 60

Val Ser Thr Gly Arg Tyr Val Ser Arg Arg Tyr Arg Glu Pro Arg Arg
65 70 75 80

Lys Arg Ser Arg Ile Asn Gln Phe Gly Trp Cys Ala Arg Arg Arg Ala
85 90 95

Ser Ser Cys Leu Pro Tyr Ala Arg Arg Phe Phe Met Gly Xaa
100 105 110

<210> 62
<211> 229

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: pIAO-pL amino acid sequence

<400> 62

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Ile Val Lys Lys Cys Lys Lys Cys Ser Ala Asn Ala Lys Arg Arg Ile
          20           25           30
Lys Ser Pro Cys Tyr Thr Cys Tyr Thr Arg Lys Lys Met Val Pro Glu
          35           40           45
Glu Thr Ser Asp Asp Ser Thr Gly Pro Val Glu Asn Pro Leu Ile Asn
          50           55           60
Ser Ile Asn Asp Arg Leu Tyr Arg Lys Leu Thr Pro Ala Glu Leu Arg
          65           70           75           80
Asn Arg Met Phe Ser Ser Thr Leu Ser Met Tyr Leu Asn Arg Met Phe
          85           90           95
Lys Lys Arg Ser Gln Val Lys Glu Gly Lys Ser Ser Val Asn His Ser
          100          105          110
Tyr Ile Ile Phe Ser Asn Ile Cys Ala Ile Asn Ile Met Gly Tyr Leu
          115          120          125
Leu Ala Met Pro Trp Arg Asn Thr Lys Arg Ser Cys Thr Met Val Ser
          130          135          140
Cys Met Gln Asp Leu Thr Asp Val Gly Gly Lys Thr Gln Asn Tyr Tyr
          145          150          155          160
Met Val Met Gln Pro Lys Gly Thr Ser Glu Asn Ile Ser Ala Asp Glu
          165          170          175
Asp Cys Ser Ser Leu Leu Tyr Val Met Lys Ala Pro Lys Pro Lys Tyr
          180          185          190
Ser Val Leu Thr Leu Pro Gly Asp Phe Cys Phe Met Ser Thr Gly Val
          195          200          205
Pro Arg Ser Arg Ser Asn Lys Leu Val Glu Pro Ile Glu Arg Lys Asn
          210          215          220
Ser Arg Val Thr Gly
          225

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<210> 63

<211> 9984

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
pIAO-p/L-Lambda-2.2kb sequence

<400> 63

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<220>
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 pIAO-p/L-Lambda-2.2kb amino acid sequence

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 35 40 45
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<210> 65
 <211> 470
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 pIAO-p/L-Lambda-2.2kb amino acid sequence

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 20 25 30
 Ser Trp Leu Lys Lys Ser His Asn Leu Phe Ala Arg Phe Arg Val Ala
 35 40 45
 Ile Ile Leu Pro Pro Ile Trp Phe Lys Asp Ser Thr Phe Val Gly Ser
 50 55 60
 Asn Phe Cys Arg Leu Glu Arg Ile Asp Tyr Gly Ser Pro Tyr Tyr Lys
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 Asn Ser Arg Lys Val Thr Pro Ser Glu Val His Leu Ile Lys Ser Gly
 85 90 95
 Arg Ala Thr Ser Ser Pro Phe Ser Asn Cys Asn Asn Ser Cys Trp Gln
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 Thr Cys Arg Thr Leu Arg Lys Ile Asn Thr Phe Phe Cys Leu Ala Phe
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Thr Ser Ala Ser Ser Gly Arg Thr Arg Ile Phe Ser Ile Val Lys Arg
 130 135 140
 Trp Arg Cys Arg Ser Ile Lys His Tyr Tyr Ile Phe Cys Asn Cys Thr
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 Trp Leu Glu Asn Ser Ala Ser Ile Glu Pro Tyr Gln Leu Val Ile His
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 Ile Arg Gly Ser Ser Asp Thr Thr Thr Lys Val Arg Ile Phe His Pro
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 Gln His Thr Gly Tyr Lys Phe Leu Lys Lys Thr Lys Gln Tyr Ser Ala
 195 200 205
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 Gln Thr Trp Tyr Leu Leu Ile Thr Tyr Arg Lys Ser Pro Thr Thr Arg
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 275 280 285
 Lys Arg Pro Gln His Asn Cys Trp Asp Asn Trp Glu Phe Asn Asn Asn
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 Trp Val Trp Glu Ala Arg Tyr Phe Cys Ser His Glu His Gln Ala Tyr
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 Phe Gly Asp Gly Phe Thr Tyr Asn Phe Gln Ile Arg Ser Cys Lys Lys
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 340 345 350
 Arg Val Thr Trp Ser Asn Arg Phe Ser Asn Gly Arg Thr Ile Leu His
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 Pro Arg Lys Lys His Arg Ser Ile Ser Lys Ala Met Ser Ser Phe Gly
 370 375 380
 Ser Tyr Ser Ser Pro Thr Phe Trp Arg Lys Ile Gln Gln Ser Cys Leu
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 Leu His Lys Arg Leu Phe Phe Val Asn Pro Thr Ser Gln Ile Lys Arg
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 Asn Ile Phe Leu His Lys Ser Arg Arg Lys Ser Arg Cys Phe Trp Asn
 420 425 430

Cys Lys Arg Tyr Arg Met Lys Trp Ala Leu Cys Tyr Ser Leu Val Asn
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Tyr Cys Leu Phe Leu Glu Leu Trp Arg Ser Thr Pro Ile Gly Lys Lys
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<210> 66

<211> 229

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
 pIAO-P/L-Lambda-2.2kb amino acid sequence

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 35 40 45

Glu Thr Ser Asp Asp Ser Thr Gly Pro Val Glu Asn Pro Leu Ile Asn
 50 55 60

Ser Ile Asn Asp Arg Leu Tyr Arg Lys Leu Thr Pro Ala Glu Leu Arg
 65 70 75 80

Asn Arg Met Phe Ser Thr Leu Ser Met Tyr Leu Asn Arg Met Phe
 85 90 95

Lys Lys Arg Ser Gln Val Lys Glu Gly Lys Ser Ser Val Asn His Ser
 100 105 110

Tyr Ile Ile Phe Ser Asn Ile Cys Ala Ile Asn Ile Met Gly Tyr Leu
 115 120 125

Leu Ala Met Pro Trp Arg Asn Thr Lys Arg Ser Cys Thr Met Val Ser
 130 135 140

Cys Met Gln Asp Leu Thr Asp Val Gly Gly Lys Thr Gln Asn Tyr Tyr
 145 150 155 160

Met Val Met Gln Pro Lys Gly Thr Ser Glu Asn Ile Ser Ala Asp Glu
 165 170 175

Asp Cys Ser Ser Leu Leu Tyr Val Met Lys Ala Pro Lys Pro Lys Tyr
 180 185 190

Ser Val Leu Thr Leu Pro Gly Asp Phe Cys Phe Met Ser Thr Gly Val
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Pro Arg Ser Arg Ser Asn Lys Leu Val Glu Pro Ile Glu Arg Lys Asn
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<210> 67
 <211> 7411
 <212> DNA
 <213> Artificial Sequence

<220>
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 pBSII-Act5c-orf sequence

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<223> Description of Unknown Organism: Optimized
piggyBac orf sequence

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